
FCC Test Report

Report No.: AGC01040200501FE03

FCC ID : 2ACN7HW807

APPLICATION PURPOSE : Original Equipment

PRODUCT DESIGNATION : Heart rate Armband

BRAND NAME : N/A

MODEL NAME : HW807, HW808, HW807F

APPLICANT : ShenZhen Fitcare Electronics Co., LTD.

DATE OF ISSUE : May 21, 2020

STANDARD(S) : FCC Part 15.247

REPORT VERSION : V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 21, 2020	Valid	Initial Release



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1. VERIFICATION OF COMPLIANCE

Applicant	ShenZhen Fitcare Electronics Co., LTD.
Address	6th Floor(south), Building A, Dingxin Science Park, 67 District, Bao'an, Shenzhen, China
Manufacturer	ShenZhen Fitcare Electronics Co., LTD.
Address	6th Floor(south), Building A, Dingxin Science Park, 67 District, Bao'an, Shenzhen, China
Factory	ShenZhen Fitcare Electronics Co., LTD.
Address	6th Floor(south), Building A, Dingxin Science Park, 67 District, Bao'an, Shenzhen, China
Product Designation	Heart rate Armband
Brand Name	N/A
Test Model	HW807
Series Model	MB-M916, MB-M918, MB-M919
Difference Description	All the same except for the model name
Date of test	May 13, 2020 to May 19, 2020
Deviation	No any deviation from the test method
Condition of Test Sample	Normal
Test Result	Pass
Report Template	AGCRT-US-BLE/RF

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with radiated emission limits of FCC part 15.247.

Prepared By

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Nini Guo
(Project Engineer)

May 19, 2020

Reviewed By

Max Zhang

Max Zhang
(Reviewer)

May 21, 2020

Approved By

Forrest Lei

Forrest Lei
(Authorized Officer)

May 21, 2020



2.GENERAL INFORMATION

2.1PRODUCT DESCRIPTION

The EUT is designed as a “Heart rate Armband”. It is designed by way of utilizing the GFSK technology to achieve the system operation.

A major technical description of EUT is described as following

Operation Frequency	2.457GHz
RF Output Power	-1.391dBm(Max)
Modulation	GFSK
Number of channels	1 Channel
Antenna Designation	PCB Antenna(Comply with requirements of the FCC part 15.203)
Antenna Gain	0.99dBi
Hardware Version	V2.1
Software Version	V2.1
Power Supply	DC 3.7V by battery

2.2. TABLE OF CARRIER FREQUENCIES

Frequency Band	Channel Number	Frequency
2400~2483.5MHZ	1	2457MHZ



2.3 RELATED SUBMITTAL(S)/GRANT(S)

This submittal(s) (test report) is intended for **FCC ID: 2ACN7HW807** filing to comply with the FCC Part 15.247 requirements.

2.4 TEST METHODOLOGY

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10 (2013). Radiated testing was performed at an antenna to EUT distance 3 meters.

2.5 SPECIAL ACCESSORIES

Refer to section 2.2.

2.6 EQUIPMENT MODIFICATIONS

Not available for this EUT intended for grant.



3. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

- Uncertainty of Conducted Emission, $U_c = \pm 3.2$ dB
- Uncertainty of Radiated Emission below 1GHz, $U_c = \pm 3.9$ dB
- Uncertainty of Radiated Emission above 1GHz, $U_c = \pm 4.8$ dB
- Uncertainty of total RF power, conducted, $U_c = \pm 0.8$ dB
- Uncertainty of RF power density, conducted, $U_c = \pm 2.6$ dB
- Uncertainty of spurious emissions, conducted, $U_c = \pm 2.7$ dB
- Uncertainty of Occupied Channel Bandwidth: $U_c = \pm 2$ %



4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1	Low channel TX(2457MHz)

Note:

1. Only the result of the worst case was recorded in the report, if no other cases.
2. For Radiated Emission, 3axis were chosen for testing for each applicable mode.
3. For Conducted Test method, a temporary antenna connector is provided by the manufacture.
4. The test software is the nRFgo Studio which can set the EUT into the individual test modes.



5. SYSTEM TEST CONFIGURATION

5.1 CONFIGURATION OF TESTED SYSTEM



5.2 EQUIPMENT USED IN TESTED SYSTEM

Item	Equipment	Model No.	ID or Specification	Remark
1	Heart rate Armband	HW807	2ACN7HW807	EUT

5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
15.247 (b)(3)	Peak Output Power	Compliant
15.247 (a)(2)	6 dB Bandwidth	Compliant
15.247 (d)	Conducted Spurious Emission	Compliant
15.247 (e)	Maximum Conducted Output Power Density	Compliant
15.209	Radiated Emission	Compliant
15.207	Conducted Emission	N/A

Note: The EUT can not use the BT function with charging

6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd
Location	1-2/F, Building 19, Junfeng Industrial Park, Chongqing Road, Heping Community, Fuhai Street, Bao'an District, Shenzhen, Guangdong, China
Designation Number	CN1259
FCC Test Firm Registration Number	975832
A2LA Cert. No.	5054.02
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by A2LA

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun. 12, 2019	Jun. 26, 2020
EXA Signal Analyzer	Agilent	N9010A	MY53470504	Dec. 12, 2019	Dec. 11, 2020
2.4GHz Fliter	EM Electronics	2400-2500MHz	N/A	Mar 23, 2020	Mar 22, 2022
Attenuator	ZHINAN	E-002	N/A	Aug. 26, 2019	Aug. 25, 2020
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep. 09, 2019	Sep. 08, 2021
Active loop antenna (9K-30MHz)	ZHINAN	ZN30900C	18051	Jun. 14, 2018	Jun. 13, 2020
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May. 26, 2018	May. 25, 2020
Broadband Preamplifier	ETS LINDGREN	3117PA	00225134	Oct. 15, 2019	Oct. 14, 2020
ANTENNA	SCHWARZBECK	VULB9168	494	Jan. 09, 2019	Jan. 08, 2021
Test software	FARA	EZ EMC (Ver.RA-03A)	N/A	N/A	N/A



7. PEAK OUTPUT POWER

7.1. MEASUREMENT PROCEDURE

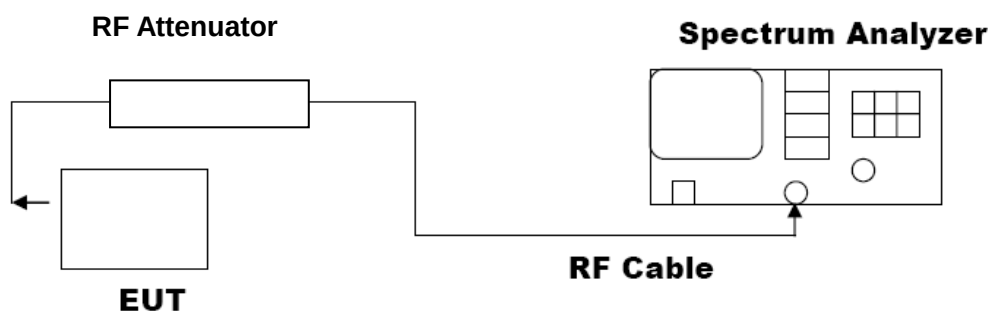
For peak power test:

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. $RBW \geq DTS \text{ bandwidth}$
3. $VBW \geq 3 * RBW$.
4. $SPAN \geq VBW$.
5. Sweep: Auto.
6. Detector function: Peak.
7. Trace: Max hold.

Allow trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power, after any corrections for external attenuators and cables.

7.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

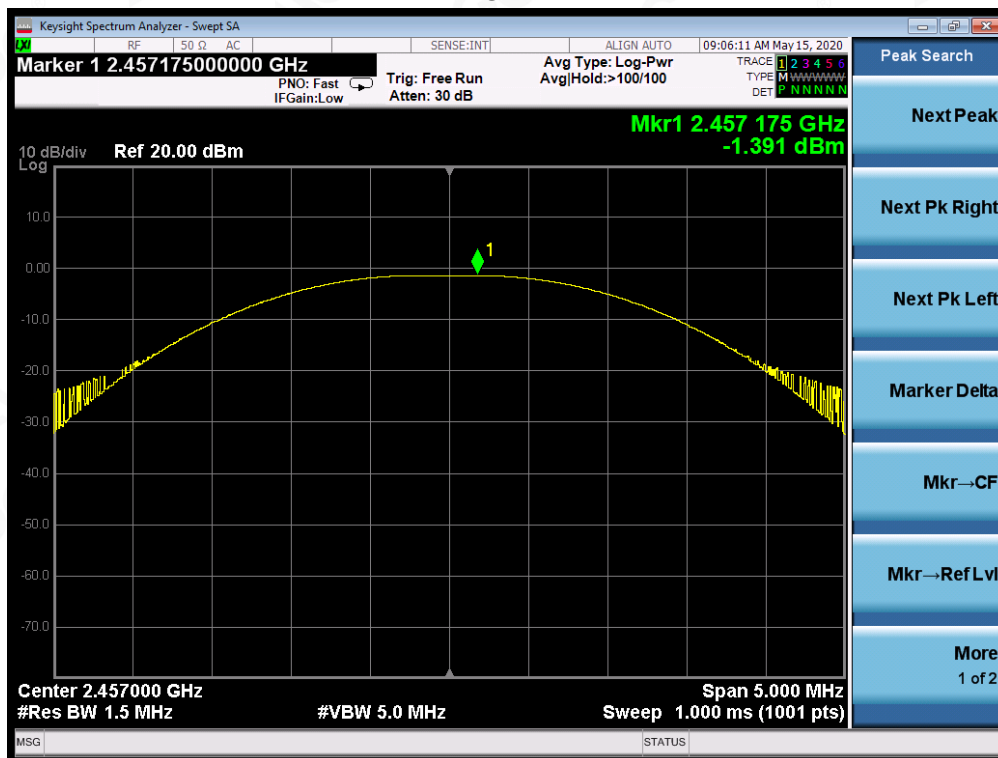
PEAK POWER TEST SETUP



7.3. LIMITS AND MEASUREMENT RESULT

OUTPUT POWER MEASUREMENT RESULT FOR GFSK MODULATION			
Frequency (GHz)	Average Power (dBm)	Applicable Limits (dBm)	Pass or Fail
2.457	-1.391	30	Pass

CH1



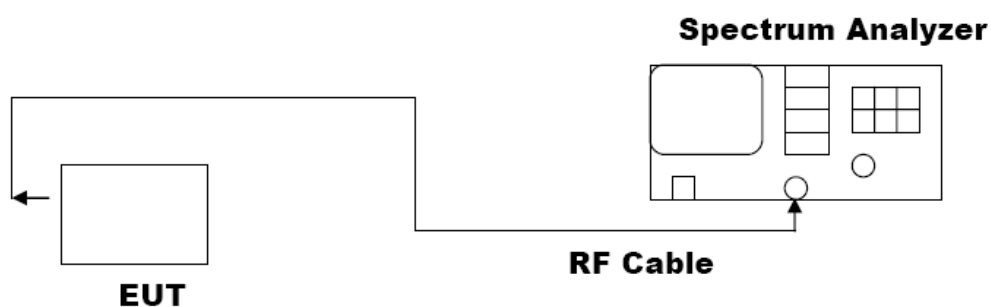
8. 6 DB BANDWIDTH

8.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Centre Frequency = Operation Frequency, RBW= 100 KHz, VBW $\geq 3 \times$ RBW.
4. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

8.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



8.3. LIMITS AND MEASUREMENT RESULTS

LIMITS AND MEASUREMENT RESULT			
Applicable Limits	Applicable Limits		
	Test Data (kHz)		Criteria
>500KHZ	2457MHz	518.3	PASS

TEST PLOT OF BANDWIDTH



9. CONDUCTED SPURIOUS EMISSION

9.1. MEASUREMENT PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

Note: The EUT was tested according to ANSI C63.10 for compliance to FCC PART 15.247 requirements.

9.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

The same as described in section 8.2.

9.3. MEASUREMENT EQUIPMENT USED

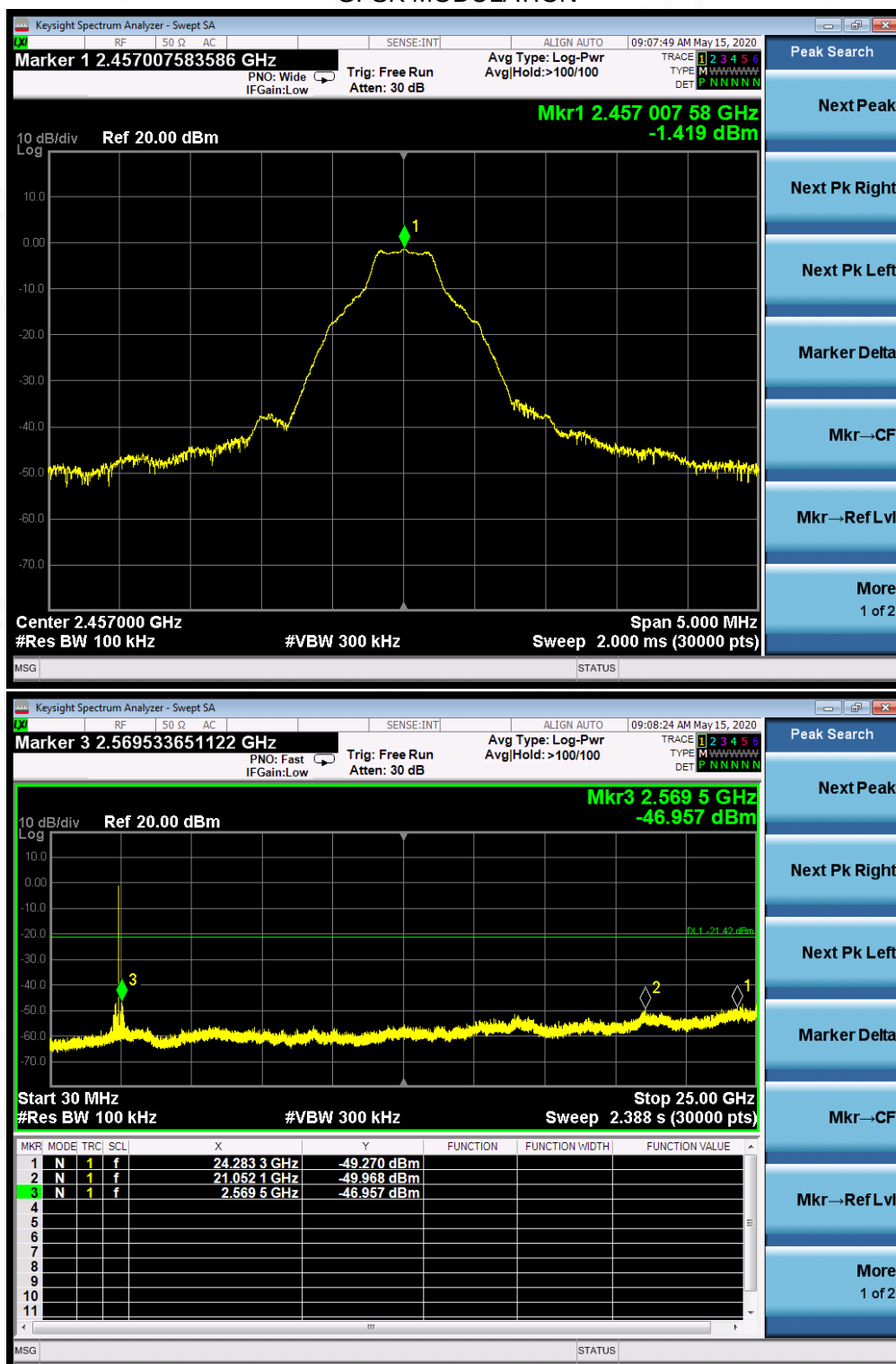
The same as described in section 6.

9.4. LIMITS AND MEASUREMENT RESULT

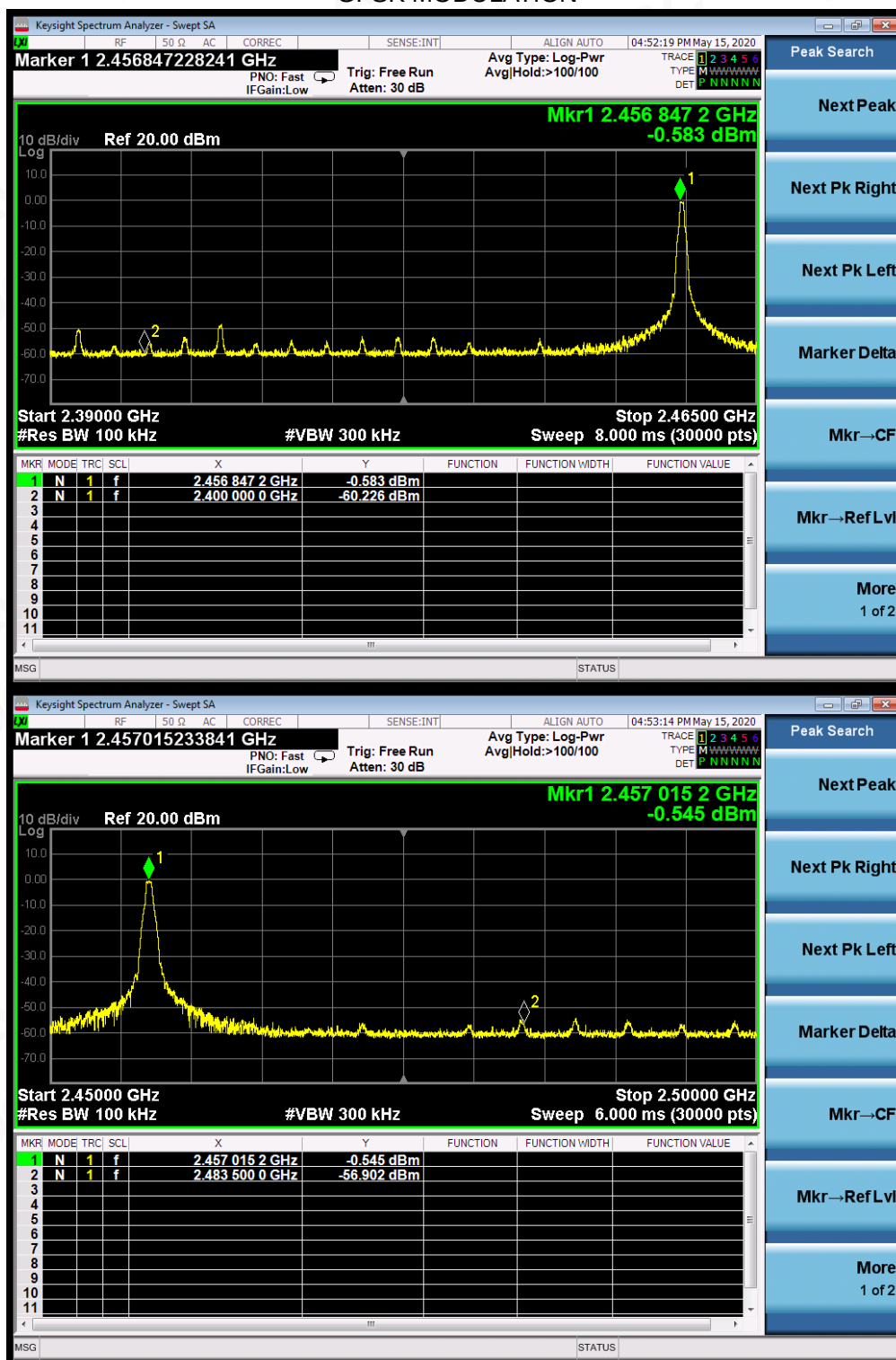
LIMITS AND MEASUREMENT RESULT		
Applicable Limits	Measurement Result	
	Test Data	Criteria
In any 100 KHz Bandwidth Outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produce by the intentional radiator shall be at least 30 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power.	At least -30dBc than the reference level	PASS



TEST RESULT FOR ENTIRE FREQUENCY RANGE GFSK MODULATION



TEST RESULT FOR BAND EDGE GFSK MODULATION



10. MAXIMUM CONDUCTED OUTPUT POWER SPECTRAL DENSITY

10.1 MEASUREMENT PROCEDURE

- (1). Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- (2). Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- (3). Set SPA Trace 1 Max hold, then View.

Note: The method of AVGPSD-1 in the ANSI C63.10 (2013) item 10.3 was used in this testing.

10.2 TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)

Refer To Section 8.2.

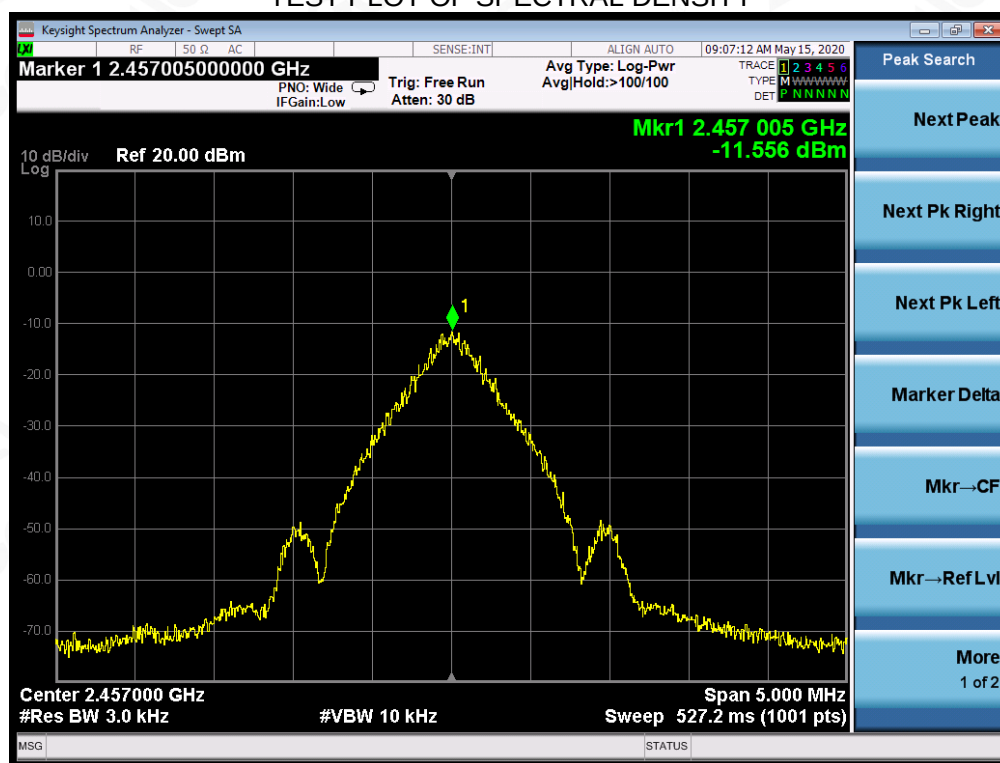
10.3 MEASUREMENT EQUIPMENT USED

Refer To Section 6.

10.4 LIMITS AND MEASUREMENT RESULT

Channel No.	Power density (dBm/20kHz)	Limit (dBm/3kHz)	Result
2457MHz	-11.559	8	Pass

TEST PLOT OF SPECTRAL DENSITY



11. RADIATED EMISSION

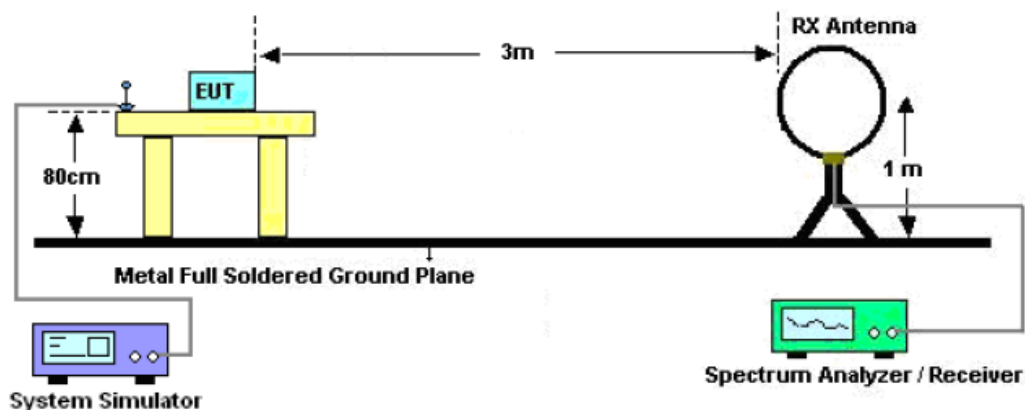
11.1. MEASUREMENT PROCEDURE

1. The EUT was placed on the top of the turntable 0.8 or 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz RBW and 3MHz VBW for peak reading. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
7. When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum values.
8. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
9. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
10. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High - Low scan is not required in this case.

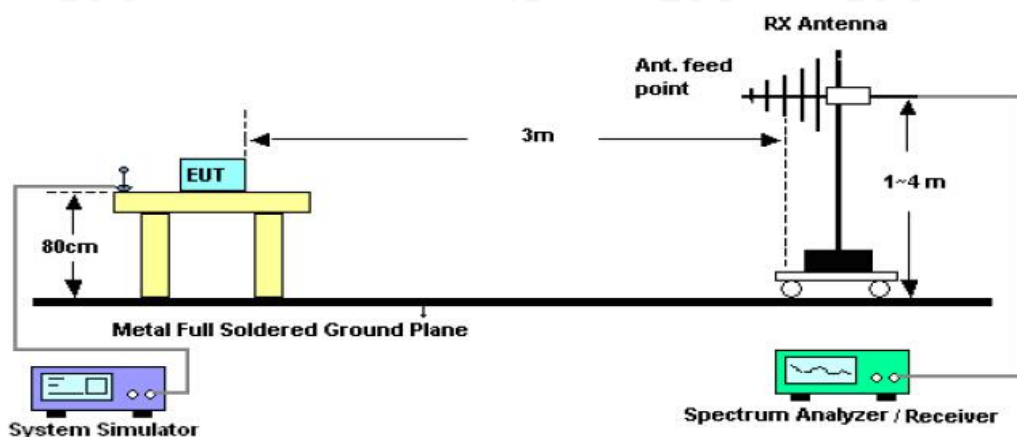


11.2. TEST SETUP

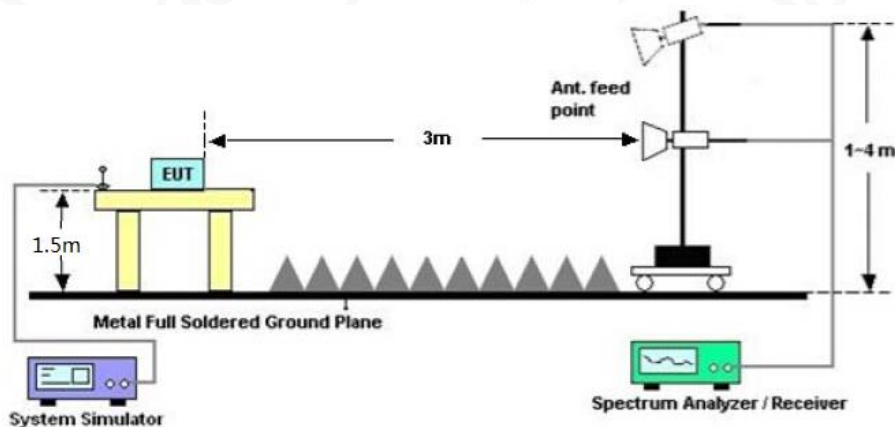
Radiated Emission Test-Setup Frequency Below 30MHz



RADIATED EMISSION TEST SETUP 30MHz-1000MHz



RADIATED EMISSION TEST SETUP ABOVE 1000MHz



11.3. LIMITS AND MEASUREMENT RESULT

15.209 Limit in the below table has to be followed

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

Note: All modes were tested For restricted band radiated emission,
the test records reported below are the worst result compared to other modes.

11.4. TEST RESULT

RADIATED EMISSION BELOW 30MHZ

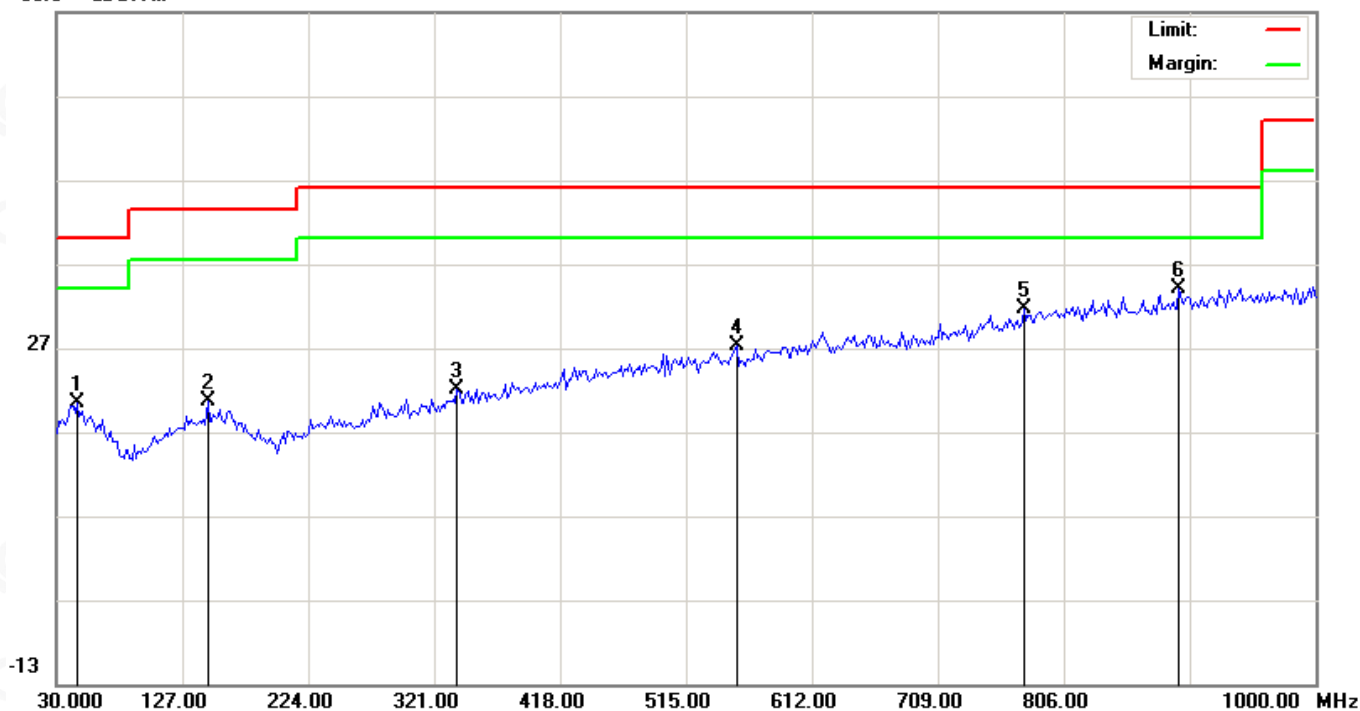
No emission found between lowest internal used/generated frequencies to 30MHz.



RADIATED EMISSION BELOW 1GHZ

EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

66.9 dBuV/m

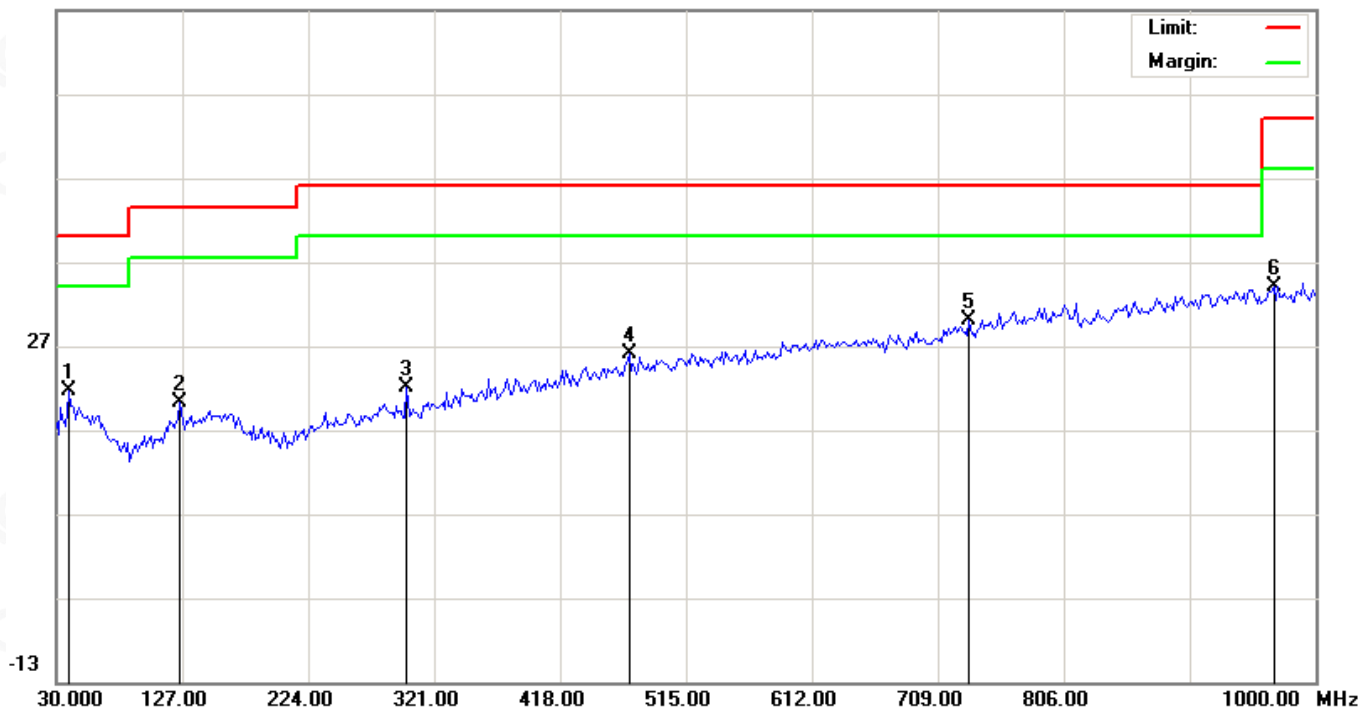


No.	Mk	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		46.1667	0.62	19.87	20.49	40.00	-19.51	peak			
2		146.4000	1.34	19.22	20.56	43.50	-22.94	peak			
3		338.7833	1.19	20.83	22.02	46.00	-23.98	peak			
4		553.8000	1.08	26.04	27.12	46.00	-18.88	peak			
5		775.2833	1.75	29.85	31.60	46.00	-14.40	peak			
6	*	894.9167	2.42	31.63	34.05	46.00	-11.95	peak			

RESULT: PASS


EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

66.9 dBuV/m



No.	Mk	Freq. MHz	Reading dBuV	Factor dB/m	Measurement dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1		39.7000	1.60	19.98	21.58	40.00	-18.42	peak			
2		125.3833	1.83	18.31	20.14	43.50	-23.36	peak			
3		299.9833	2.46	19.47	21.93	46.00	-24.07	peak			
4		471.3500	1.50	24.41	25.91	46.00	-20.09	peak			
5	*	733.2500	1.15	28.90	30.05	46.00	-15.95	peak			
6		967.6667	1.76	32.28	34.04	54.00	-19.96	peak			

RESULT: PASS
Note:

1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.



RADIATED EMISSION ABOVE 1GHZ

EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4914.000	47.23	0.08	47.31	74	-26.69	peak
4914.000	41.14	0.08	41.22	54	-12.78	AVG
7371.000	43.58	2.21	45.79	74	-28.21	peak
7371.000	37.43	2.21	39.64	54	-14.36	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
4914.000	44.29	0.08	44.37	74	-29.63	peak
4914.000	38.42	0.08	38.5	54	-15.5	AVG
7371.000	41.57	2.21	43.78	74	-30.22	peak
7371.000	35.71	2.21	37.92	54	-16.08	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RESULT: PASS

Note:

Other emissions from 1G to 25 GHz are considered as ambient noise. No recording in the test report.

Factor = Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The “Factor” value can be calculated automatically by software of measurement system.



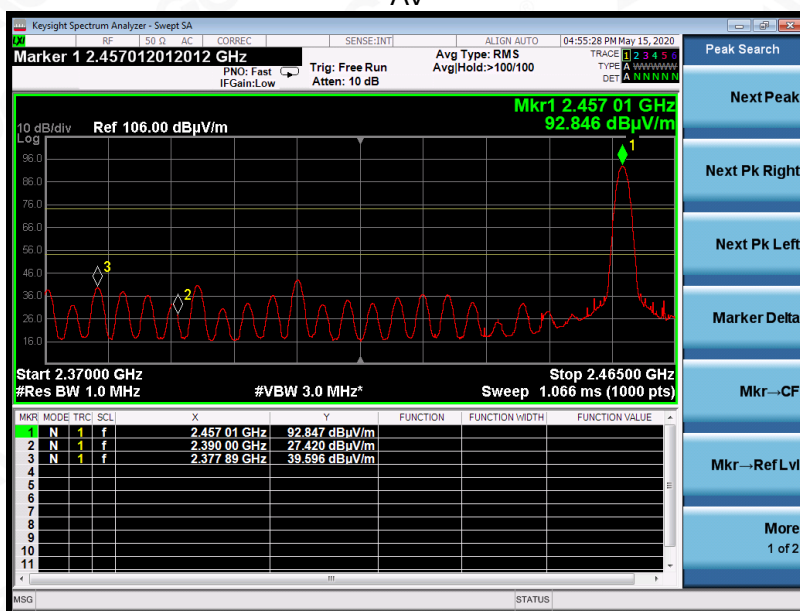
TEST RESULT FOR RESTRICTED BANDS REQUIREMENTS

EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

PK



AV



RESULT: PASS

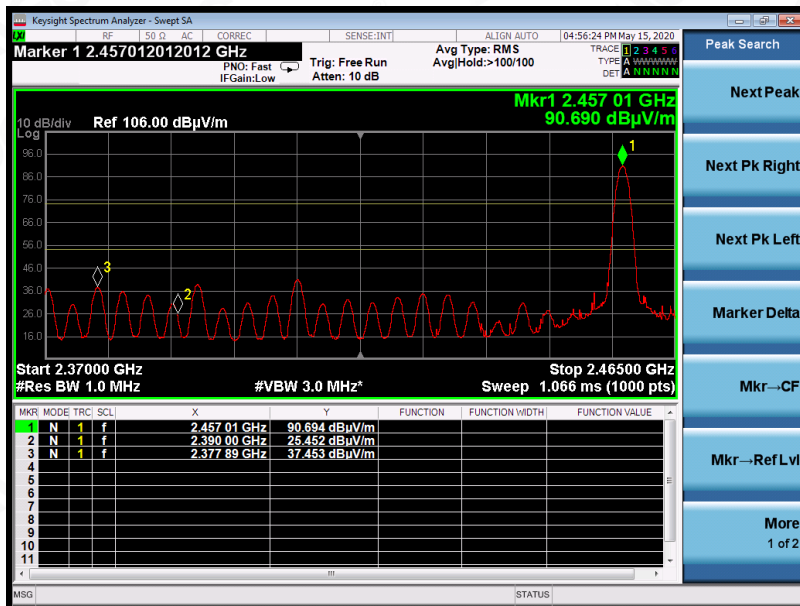


EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

PK



AV

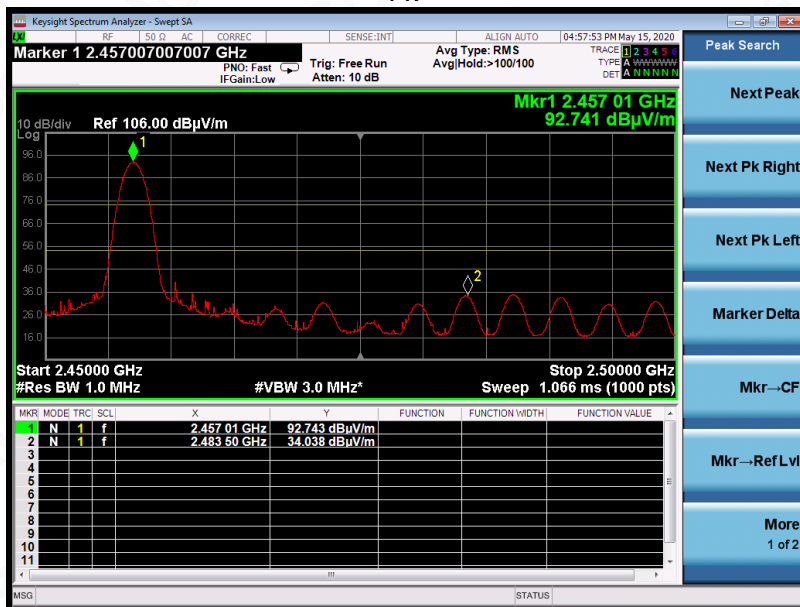


EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Horizontal

PK



AV



RESULT: PASS

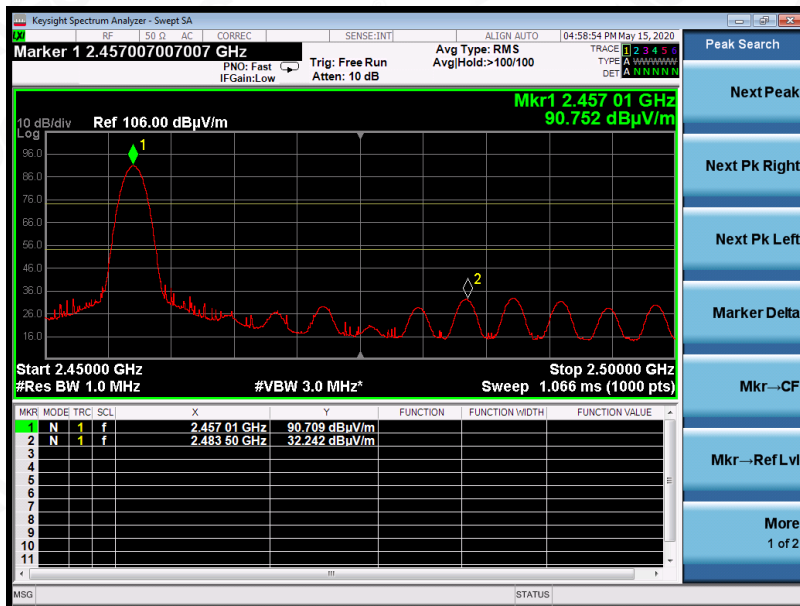


EUT	Heart rate Armband	Model Name	HW807
Temperature	25° C	Relative Humidity	55.4%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	Mode 1	Antenna	Vertical

PK



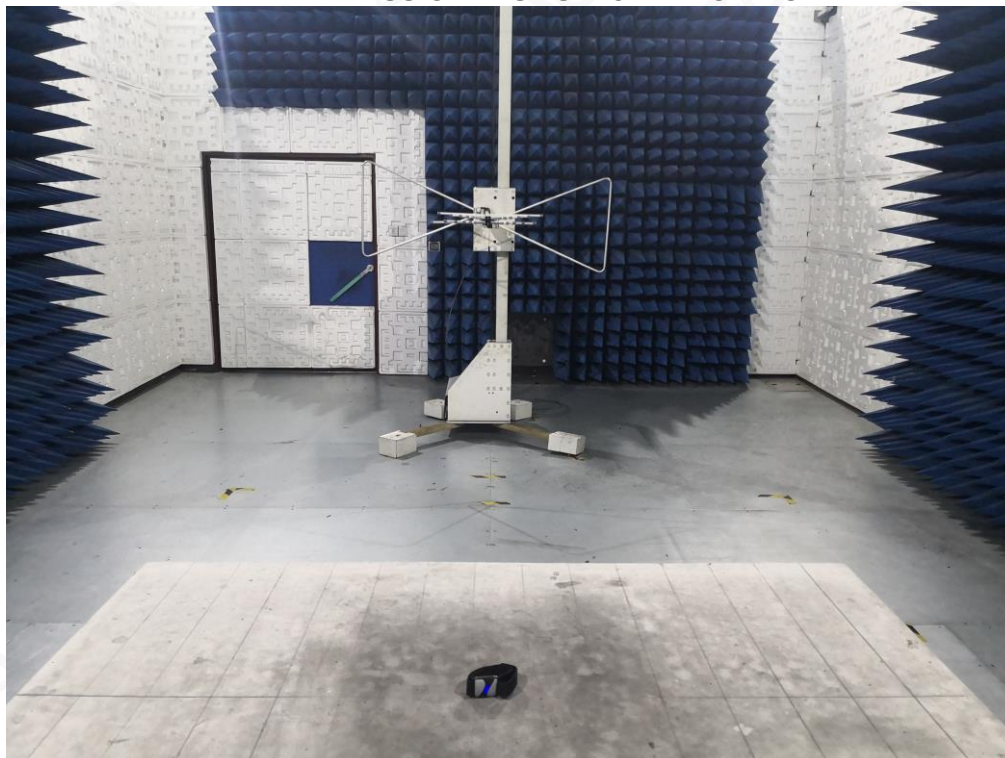
AV



RESULT: PASS

Note: The factor had been edited in the "Input Correction" of the Spectrum Analyzer. So the Amplitude of test plots is equal to Reading level plus the Factor in dB. Use the A dB(μV) to represent the Amplitude. Use the F dB(μV/m) to represent the Field Strength. So A=F.



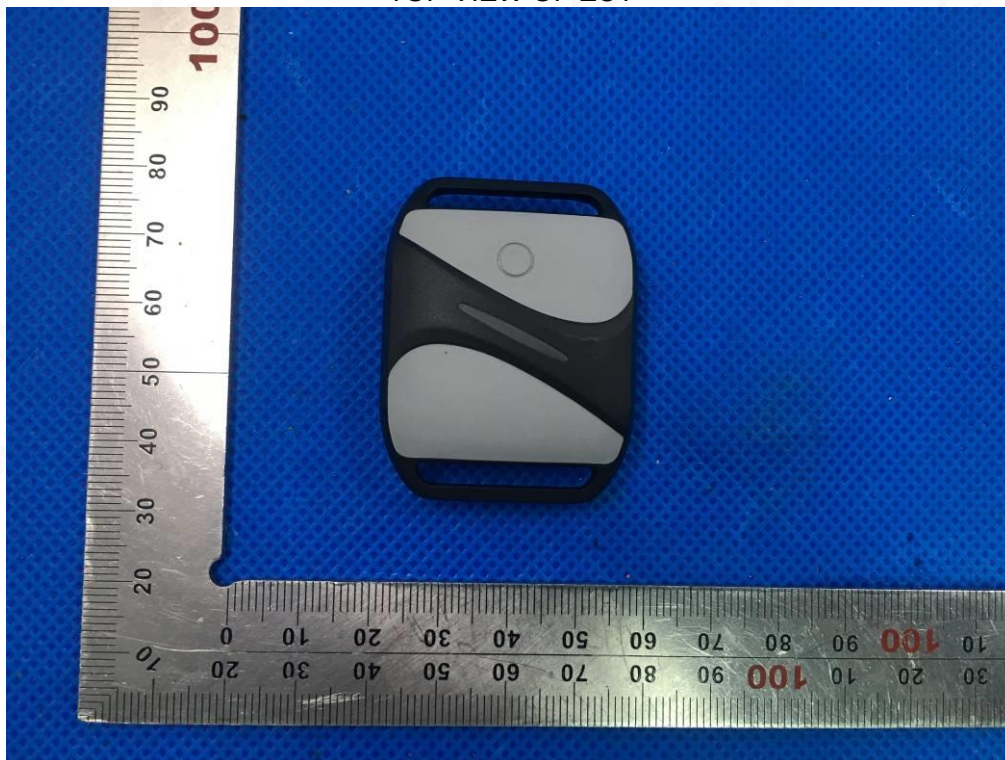
APPENDIX A: PHOTOGRAPHS OF TEST SETUP**RADIATED EMISSION TEST SETUP BELOW 1GHZ****RADIATED EMISSION TEST SETUP ABOVE 1GHZ**

APPENDIX B: PHOTOGRAPHS OF EUT

ALL VIEW OF EUT



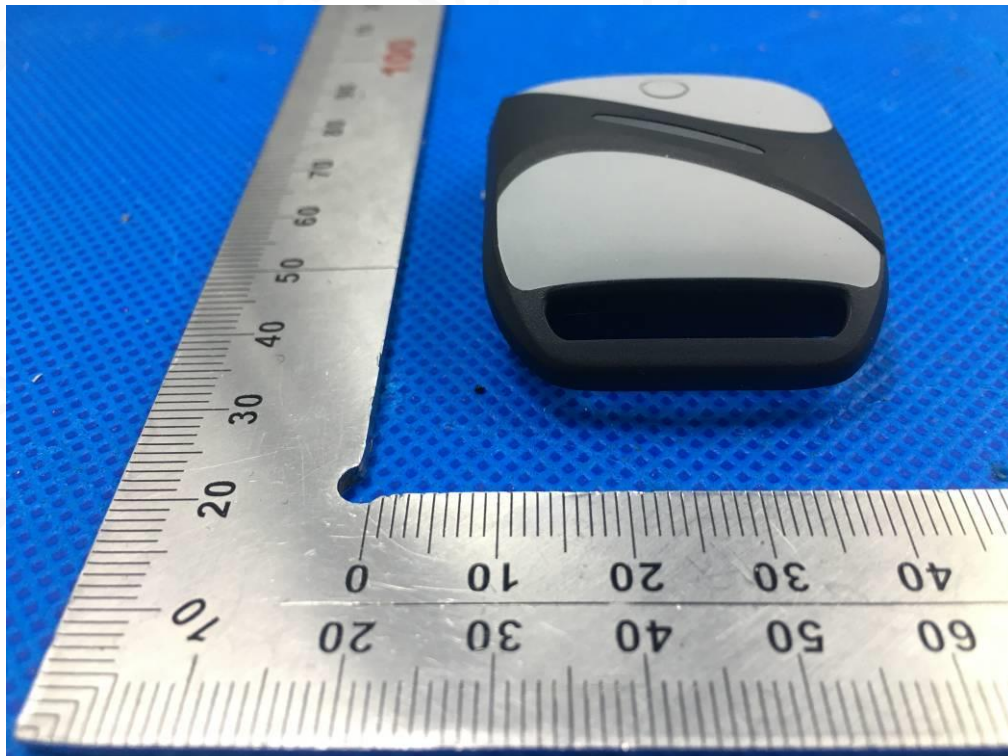
TOP VIEW OF EUT



BOTTOM VIEW OF EUT



FRONT VIEW OF EUT



BACK VIEW OF EUT



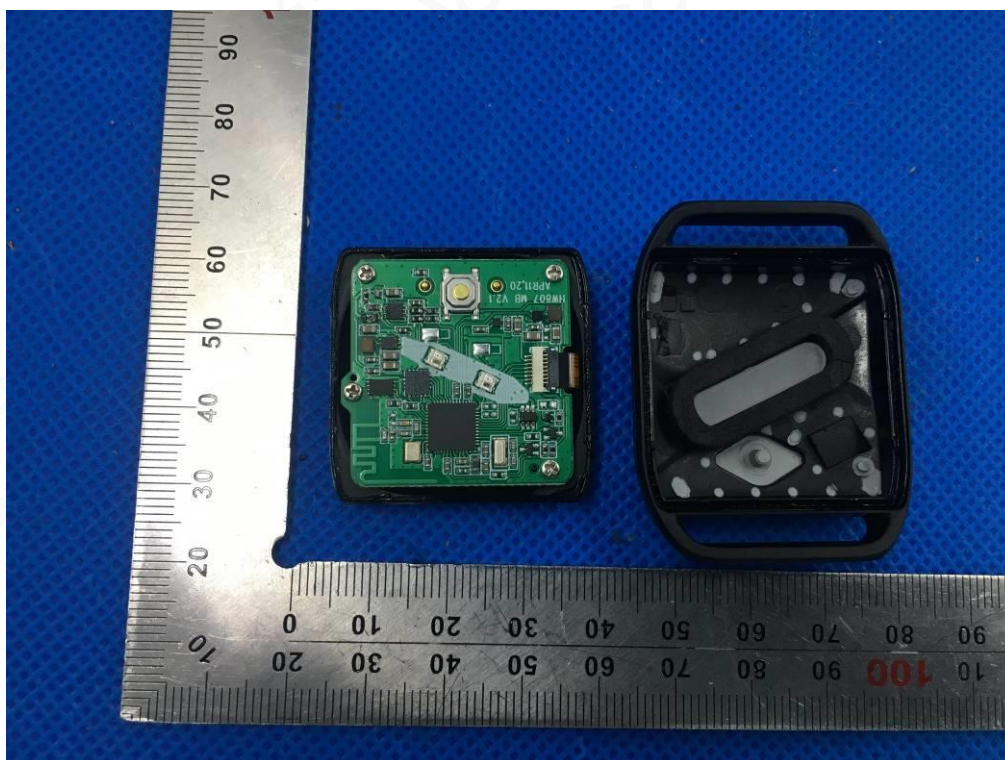
LEFT VIEW OF EUT



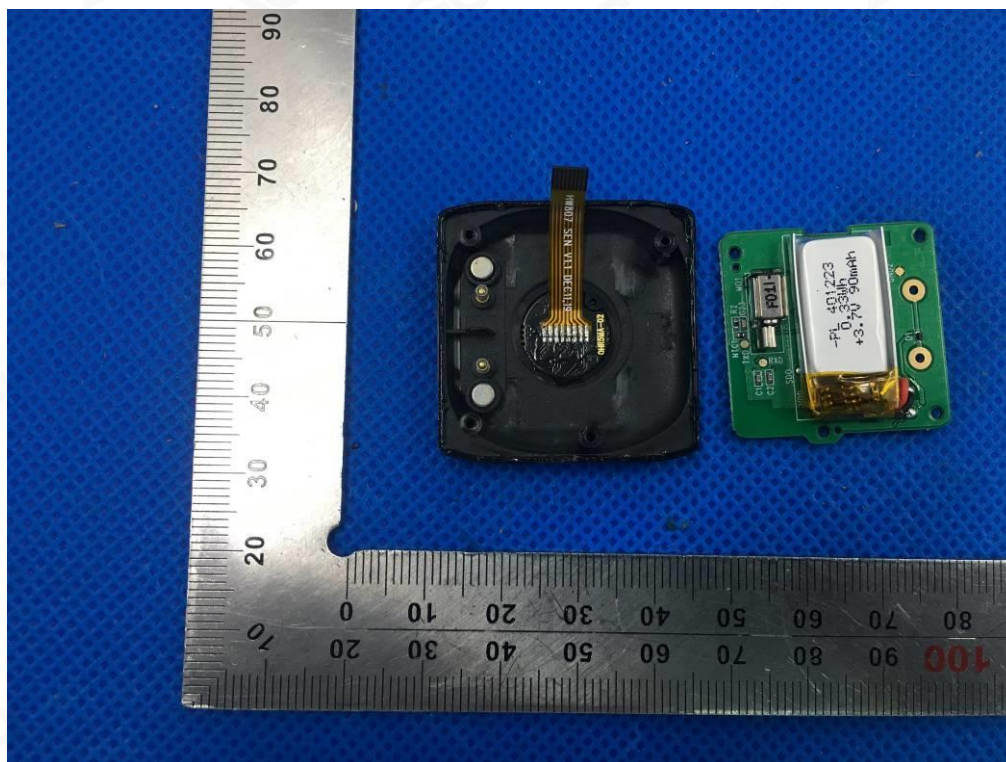
RIGHT VIEW OF EUT



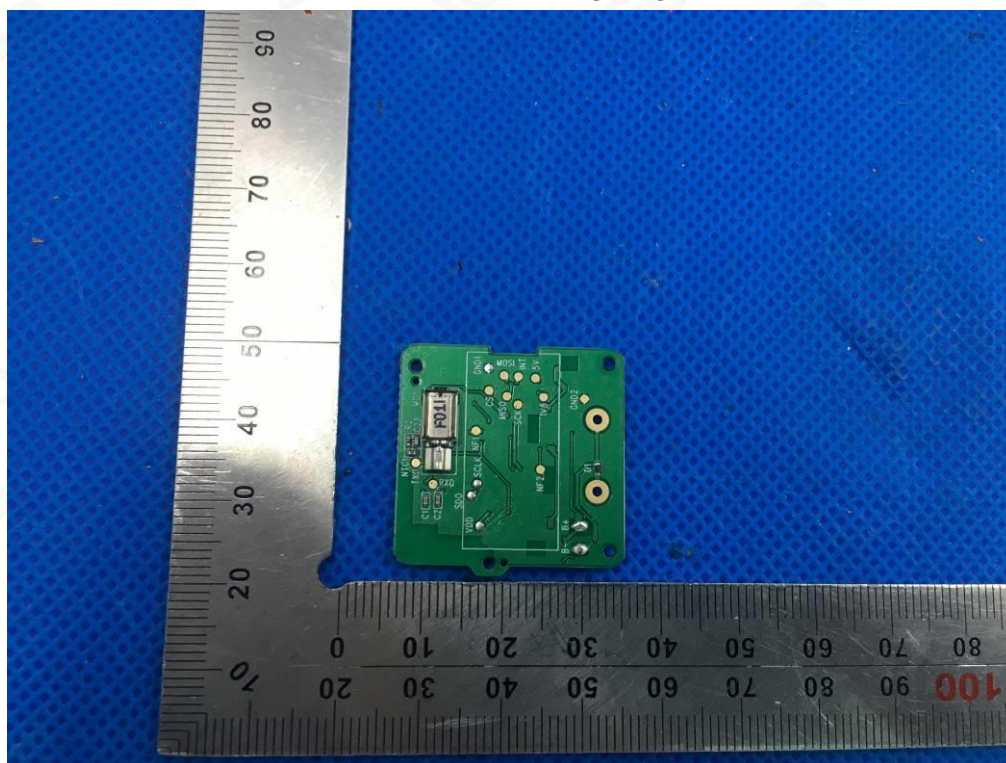
OPEN VIEW OF EUT-1



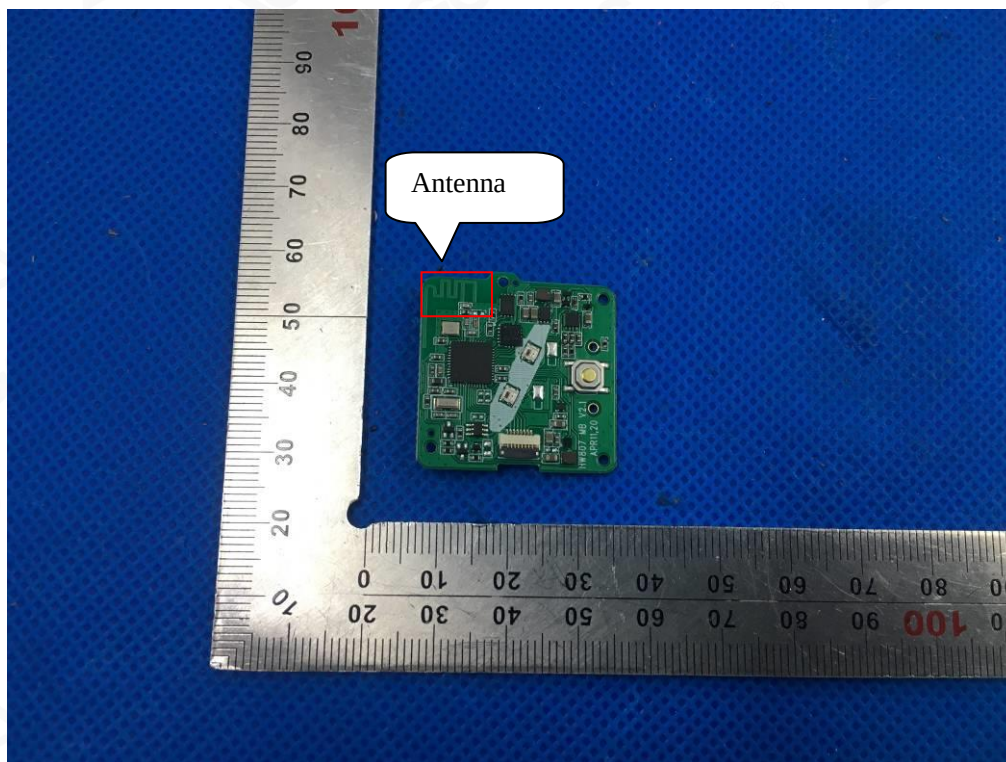
OPEN VIEW OF EUT-2



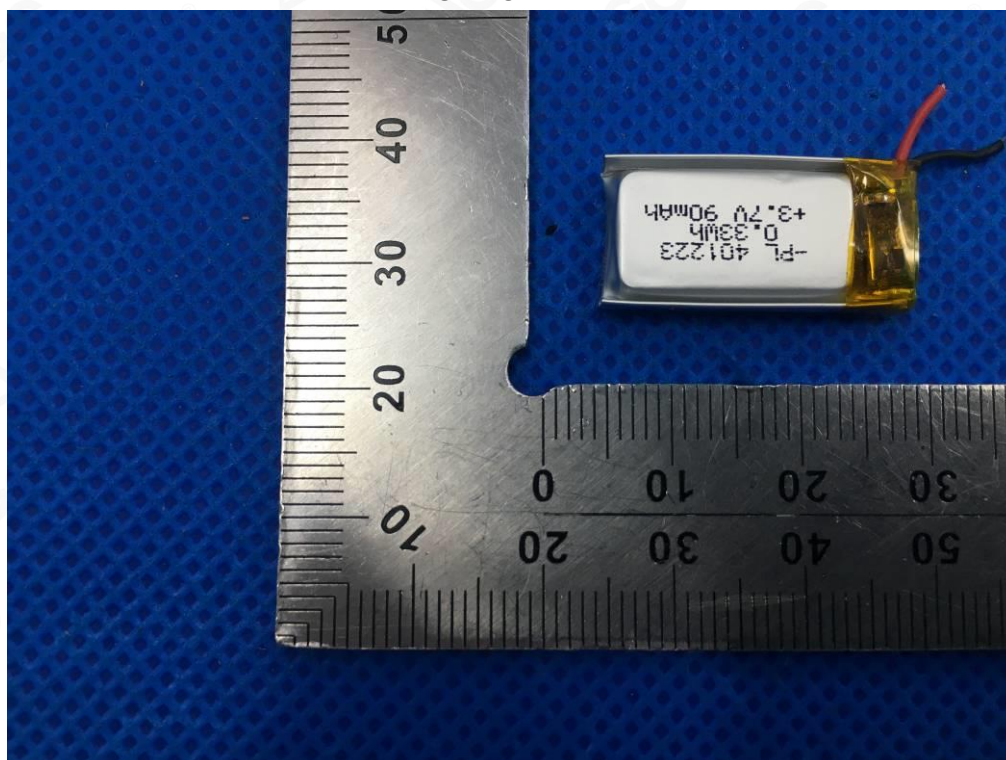
INTERNAL VIEW-1 OF EUT



INTERNAL VIEW-2 OF EUT



VIEW OF EUT BATTERY



-----END OF REPORT-----